

Inheritance of some important agronomic traits in common wheat

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5. SUMMARY The aim of this investigation was to determine the heterosis, inbreeding depression, potency ratio, epistatic deviation, gene action, genetic coefficient of variation, heritability and genetic advance for some growth and yield characteristics, i.e. heading date, maturity date, plant height, flag leaf area, no. of tillers/plant, no. of spikes/plant, spike length, no. of kernels/spike, 1000-kernel weight, biological yield/plant, grain yield/plant, straw yield/plant and harvest index. The experiments were conducted at Etay El-Baroud Agricultural Research Station. Each experiment included three crosses where, P1, P2, F1, F2, Bc1 and Bc2 for each cross were grown in a randomized complete block design with three replicates. The obtained results can be summarized as follows:

- The F1 mean values exceeded the mid-parent for all studied traits in the three crosses except for days to heading which was earlier than the mid-parent, indicating partial dominance.
- The F2 mean values were approximately equal to the mid-parent values and less than the F1 mean values, indicating that inbreeding depression was occurred.
- Significant positive heterotic effects were obtained for plant height, height up to flag leaf, peduncle length, flag leaf area, no. of tillers/plant no. of spikes/plant, no. of spikelets/spike, no. of kernels/spike, 1000-kernel weight, biological yield/plant, grain yield/plant and harvest index in the three crosses, heading date and straw yield in the first and third crosses and spike length, maturity date in the second cross.
- Significant negative heterotic effects were found for maturity date in the first and third crosses, and straw yield/plant in the third cross.
- Significant negative inbreeding depression values were found for maturity date in the first and third cross, flowering date in the first and second crosses and peduncle length in the first cross. Insignificant inbreeding depression values were shown for biological yield/plant, peduncle length and straw yield/plant in the third cross. Significant positive inbreeding depression values were obtained in other cases.
- The additive type of gene action was higher in magnitude than dominance type in plant height and peduncle length in the three crosses, heading date, maturity date and no. of kernels/spike in the first and third cross, height up to flag leaf in the first and second cross, no. of spikes/plant, biological and straw yields/plant in the second and third cross and flag leaf area in the first cross.
- The estimates of dominance effects were significant either positive or negative for all traits except peduncle length in the three crosses. Heading date in the first cross, plant height and straw yield/plant in the third cross and no. of spikes/plant in the second cross.
- Insignificant F2 deviation (EI), backcross deviation (E2) and the various estimates for epistatic gene action (aa, ad, dd) were detected for, flag leaf area, no. of tillers/plant in the second and third crosses, no. of spikes/plant in the third cross, no. of spikelets/spike, grain yield/plant and harvest index in the first cross and number of kernels/spike in the three crosses.
- For heading and maturity dates in the three crosses, heritability in narrow sense was high in magnitude and nearly equals its corresponding in the broad sense.
- For plant height in the first and second crosses, no. of spikes/plant in the first and third cross, spike length, no. of kernels/spike, biological yield and grain yield/plant in the first crosses, no. of spikelets/spike in the second cross and harvest index in the third cross, high estimates for heritability in the broad sense was accompanied by moderate value for the narrow sense.
- For other cases, high estimate for heritability in the broad sense was accompanied by low values for the narrow ones.
- Genetic gain was rather higher for no. of spikes/plant in the first and third crosses, no. of tillers/plant in the three crosses, and number of

kernels /spike in the second cross. Moderate gain was found for heading date, peduncle length, spike length, grain yield/plant, and flag leaf area in the three crosses, height up to flag leaf, no. of spikelets/spike and no. of kernels/spike in the first and third cross, harvest index in the first and second crosses, 1000-kernel weight in the second cross and biological yield/plant in the first cross. Relatively low gain was found for remaining cases. Summary -73-